

REMARKS

The Examiner did not examine claim 58. Applicants respectfully request that the Examiner either indicate that claim 58 is allowable or provide grounds for rejecting claim 58.

Claim 4 has been amended herein to be rewritten in independent form and is otherwise the same claim 4 as existed prior to being amended herein.

The Examiner rejected claims 1, 4, 47, 63, 64-66 and 70-73 under 35 U.S.C. § 102(b) as allegedly being anticipated by Mochizuki 4,533,935, previously cited.

The Examiner rejected claims 1, 5, 10-12, 47, 55, 56, 57, 60-66, 67, 69 and 71-73 under 35 U.S.C. § 102(b) as allegedly being anticipated by Gofuku *et al.* 4,785,157, newly cited.

The Examiner rejected claims 16, 20, 23 and 74-75 under 35 U.S.C. § 103(a) as allegedly being unpatentable over Basseches *et al.* 3,148,129 in view of Poisel 4,485,370, previously applied.

The Examiner rejected claims 24, 49-50, 66 and 75 under 35 U.S.C. § 103 as allegedly being unpatentable over Basseches *et al.* as applied to claims 16, 20, 23 and 74-75 above, and further in view of Mochizuki *et al.* 4,533,935 and Skill level of an ordinary person in the art.

The Examiner rejected claims 4 and 59 under 35 U.S.C. § 103 as allegedly being unpatentable over Gofuku *et al.* as applied to claims 1, 5, 10-12, 47, 55, 56, 57, 60-66, 67, 69 and 71-73 above, and further in view of Mochizuki *et al.* 4,533,935 and Skill level of an ordinary person in the art.

The Examiner rejected claims 51-54, 68 and 70 under 35 U.S.C. § 103 as allegedly being unpatentable over Gofuku *et al.* as applied to claims 1,5, 10-12, 47, 55, 56, 57, 60-66, 67,69 and

71-73, above, and further in view of Wang *et al.* 5,547,881 and Blanchard 4,707,909, newly cited.

Applicants respectfully traverse the §102 and § 103 rejections with the following arguments.

35 U.S.C. § 102(b): Claims 1, 4, 47, 63, 64-66 and 70-73 (Mochizuki)

The Examiner rejected claims 1, 4, 47, 63, 64-66 and 70-73 under 35 U.S.C. § 102(b) as allegedly being anticipated by Mochizuki 4,533,935, previously cited.

Claim 1

Since claim 1 has been canceled, the rejection of claim 1 as allegedly anticipated by Mochizuki is moot.

Claims 4, 47, 63-66, and 70-73

Applicants respectfully contend that Mochizuki does not anticipate claims 4, 47, 63-66, and 70-73, because Mochizuki does not teach each and every feature of claims 4, 47, 63-66, and 70-73. For example, Mochizuki does not teach the feature: “wherein the gas is selected from the group consisting of a flowing gas and a non-flowing gas” (claims 4, 47, 63, 66, 70, and 71); “wherein the gas is a flowing gas” (claims 64 and 72); and “wherein the gas is a non-flowing gas” (claim 65 and 73).

The Examiner argues: “Mochizuki teaches ... oxidizing a fraction F of a surface layer of the resistor with oxygen particles (dry oxygen, a gas) or NH₃ or nitrogen (a gas), ... gas is inherently either flowing or non-flowing”.

In response, Applicants first point out that the Markush group language of the preceding claimed feature (“wherein the gas is selected from the group consisting of a flowing gas and a non-flowing gas”) requires that the gas must consist of a flowing gas or a non-flowing gas. Moreover, the Markush group language of the preceding claimed feature excludes the possibility

that the gas may include both a flowing portion and a non-flowing portion, which reveals the error in the Examiner's inherency argument.

The legal test for inherency, as indicated in MPEP 2112(IV), is as follows: "In relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art." *Ex parte Levy*, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990).

Thus, the Examiner's argument that "gas is inherently either flowing or non-flowing" is incorrect as applied to Mochizuki, because it does not necessarily flow from the teachings of Mochizuki that the gas disclosed by Mochizuki must be either flowing or non-flowing. Mochizuki discloses only an atmosphere of gas (see, e.g., Mochizuki, col. 3, lines 43-44; col. 4, lines 50-51), and there is no disclosure in Mochizuki that precludes the possibility that said atmosphere of gas include both flowing and non-flowing portions. For example, the atmosphere of gas may be configured to include both flowing and non-flowing portions. However, the Markush group language of the preceding claimed feature excludes the possibility that the gas may include both a flowing portion and a non-flowing portion. Therefore, the Examiner's inherency argument is not persuasive.

Based on the preceding arguments, Applicants respectfully maintain that Mochizuki does not anticipate 4, 47, 63-66, and 70-73, and that claims 4, 47, 63-66, and 70-73 are in condition for allowance.

35 U.S.C. § 102(b): Claims 1, 5, 10-12, 47, 55, 56, 57, 60-66, 67, 69 and 71-73 (Gofuku)

The Examiner rejected claims 1, 5, 10-12, 47, 55, 56, 57, 60-66, 67, 69 and 71-73 under 35 U.S.C. § 102(b) as allegedly being anticipated by Gofuku *et al.* 4,785,157, newly cited.

Claim 1

Since claim 1 has been canceled, the rejection of claim 1 as allegedly anticipated by Gofuku is moot.

Claims 63-65

Claims 63-65 depend from claim 4, and claim 4 is not alleged by the Examiner to be anticipated by Gofuko. Applicants agree that claim 4 is not anticipated by Gofuko. Accordingly, since claims 63-65 depends from claim 4, Applicants respectfully contend that claims 63-65 are likewise not anticipated by Gofuko

Claim 66

Claim 66 depends from claim 23, and claim 23 is not alleged by the Examiner to be anticipated by Gofuko. Applicants agree that claim 23 is not anticipated by Gofuko. Accordingly, since claim 66 depends from claim 23, Applicants respectfully contend that claim 66 is likewise not anticipated by Gofuko.

Claims 47 and 71-73

Applicants respectfully contend that Gofuku does not anticipate claims 47 and 71-73,

because Gofuku does not teach each and every feature of claims 47 and 71-73.

For example, Gofuku does not teach the feature: “wherein a dimension of the resistor does not exceed about 1 micron”.

Based on the preceding argument, Applicants respectfully maintain that Gofuku does not anticipate claims 47 and 71-73.

Claims 5, 10-12, 55-57, 60-62, 67, and 69

Applicants respectfully contend that Gofuku does not anticipate claims 5 and 67, because Gofuku does not teach each and every feature of claims 5 and 67.

For example, Gofuku does not teach the feature:

“heating a portion of the surface layer at a heating temperature, wherein an exterior surface of said portion consists essentially of the fraction F of the exterior surface of the surface layer, and wherein a combination of the oxygen concentration and the heating temperature is sufficient to oxidize the portion of the surface layer by reacting said portion with the oxygen-comprising molecules, wherein heating the portion of the surface layer includes directing a beam into the portion of the surface layer such that the beam causes the heating of the portion of the surface layer, and wherein the beam is selected from the group consisting a beam of radiation and a beam of particles” (claim 1);

“heating a portion of the surface layer at a heating temperature, wherein an exterior surface of said portion consists essentially of the fraction F of the exterior

surface of the surface layer, and wherein a combination of the molecular concentration and the heating temperature is sufficient to molecularize the portion of the surface layer by reacting said portion with the gaseous molecules, wherein heating the portion of the surface layer includes directing a beam into the portion of the surface layer such that the beam causes the heating of the portion of the surface layer, wherein the beam is selected from the group consisting a beam of radiation and a beam of particles, wherein to molecularize consists of to oxidize if the gaseous molecules at the molecular concentration consist of oxygen-comprising molecules at the oxygen concentration, and wherein to molecularize consists of to nitridize if the gaseous molecules at the molecular concentration consist of nitrogen-comprising molecules at the nitrogen concentration” (claim 67).

The preceding features of claims 5 and 67 require that a portion of the surface layer of the resistor be heated at a heating temperature, wherein the beam causes the heating of the portion of the surface layer of the resistor. Gofuku does not teach that the beam of radiation causes heating of a portion of the surface layer of the resistor. The disclosed function of the beam of radiation in Gofuku is not a heating function, but rather the function of causing a change in the chemical state of the resistor so as to change (i.e., increase or decrease) the electrical resistance of the resistor, See Gofuku, col. 4, line 64 - col. 5, line 15; col. 6, lines 22-33; col. 7, lines 36-42.

Based on the preceding arguments, Applicants respectfully maintain that Gofuku does not anticipate claims 5 and 67, and that claims 5 and 67 are in condition for allowance. Since claims

10-12, 55-57, and 60-62 depend from claim 5, Applicants contend that claims 10-12, 55-57, and 60-62 are likewise in condition for allowance. Since claim 69 depends from claim 67, Applicants contend that claim 69 is likewise in condition for allowance.

In addition with respect to claim 12, Applicants respectfully contend that Gofuku does not teach the feature: “wherein $F = 1$ ”. The Examiner argues: “F can be equal to 1, when laser beam 6, 7 scans entire surface of resistor layer1, fig. 1.” In response, Applicants assert that Gofuku does not anywhere teach that the laser beam 6, 7 scans entire surface of resistor layer1. FIG. 1 most certainly not disclose that the laser beam 6, 7 scans entire surface of resistor layer1.

In addition with respect to claim 55, Applicants respectfully contend that Gofuku does not teach the feature: “wherein said oxidizing results in a thickness of the oxidized portion of the surface layer being an increasing function of an energy flux of the beam”. Applicants note that the Examiner has not even alleged that Gofuku teaches the preceding feature of claim 55.

35 U.S.C. § 103(a): Claims 16, 20, 23, and 74-75 (Basseches in view of Poisel)

The Examiner rejected claims 16, 20, 23, and 74-75 under 35 U.S.C. § 103(a) as allegedly being unpatentable over Basseches *et al.* 3,148,129 in view of Poisel 4,485,370, previously applied.

Claims 74-75

Since claims 74-75 have been canceled, the rejection of claims 74-75 as allegedly unpatentable over Basseches in view of Poisel is moot.

Claim 16

Applicants respectfully contend that claim 16 is not unpatentable over Basseches in view of Poisel, because Basseches in view of Poisel does not teach or suggest each and every feature of claim 16. For example, Basseches in view of Poisel does not teach or suggest the feature: “wherein a dimension of the resistor does not exceed about 1 micron”.

Based on the preceding arguments, Applicants respectfully maintain that claim 16 is not unpatentable over Basseches in view of Poisel, and that claim 16 is in condition for allowance.

Claim 20 and 74-75

Applicants respectfully contend that claim 20 is not unpatentable over Basseches in view of Poisel, because Basseches in view of Poisel does not teach or suggest each and every feature of claim 20. For example, Basseches in view of Poisel does not teach or suggest the feature: “providing a chemical solution which includes oxygen particles in an oxygen-comprising gas

dissolved in the chemical solution under pressurization; ... oxidizing a portion of the surface layer of the resistor by chemically reacting the oxygen particles with the portion of the surface layer such that an electrical resistance of the resistor is increased”.

Claim 23

Applicants respectfully contend that claim 23 is not unpatentable over Basseches in view of Poisel, because Basseches in view of Poisel does not teach or suggest each and every feature of claim 23. For example, Basseches in view of Poisel does not teach or suggest the features: “providing a predetermined target resistance in terms of a value R_t and a tolerance ΔR_t for the electrical resistance of the resistor; ... testing the resistor during the oxidizing step to determine whether the electrical resistance of the resistor is within $R_t \pm \Delta R_t$ ”.

The Examiner argues: “Basseches et al. discloses ... testing (monitoring with monitor means 10) the resistor 3 during the oxidizing step to determine the desired resistance has been attained, col. 2, lines 39-55”.

In response, Applicants assert that Basseches, col. 2, lines 39-55 does not disclose the preceding feature of claim 23. Although Basseches teaches continuous monitoring to determine when the desired resistance has been attained, Basseches does not disclose providing a predetermined tolerance ΔR_t and utilizing the predetermined tolerance ΔR_t to determine when the desired resistance has been attained as required by claim 23.

Based on the preceding arguments, Applicants respectfully maintain that claim 23 is not unpatentable over Basseches in view of Poisel, and that claim 23 is in condition for allowance.

35 U.S.C. § 103(a): Claims 24, 49-50, 66, and 75 (Basseches in view of Mochizuki and Skill level of an ordinary person in the art)

The Examiner rejected claims 24, 49-50, 66, and 75 under 35 U.S.C. § 103 as allegedly being unpatentable over Basseches *et al.* as applied to claims 16, 20, 23 and 74-75 above, and further in view of Mochizuki *et al.* 4,533,935 and Skill level of an ordinary person in the art.

Claim 75

Since claim 75 has been canceled, the rejection of claim 75 as allegedly unpatentable over Basseches in view of Mochizuki and Skill level of an ordinary person in the art is moot.

Claim 24

Since claim 24 depends from claim 23, which Applicants have argued *supra* to not be unpatentable over Basseches in view of Poisel under 35 U.S.C. §103(a), Applicants maintain that claim 24 is likewise not unpatentable over Basseches in view of Mochizuki and skill level of an ordinary person in the art under 35 U.S.C. §103(a).

In addition, Applicants respectfully contend that Basseches in view of Mochizuki and skill level of an ordinary person does not teach or suggest the following features of claim 24:

“wherein if during the testing step the electrical resistance of the resistor is determined to not be within $R_t \pm \Delta R_t$ then the method further comprises:

iterating such that each iteration of the iterating includes additionally executing the exposing and oxidizing steps and additionally testing the resistor during the oxidizing step to determine whether R_2 is within $R_t \pm \Delta R_t$, wherein R_2 is a latest value of the electrical resistance of the resistor as determined by said testing; and

ending the iterating if R_2 is within $R_t \pm \Delta R_t$ or if $(R_2 - R_1) (R_t - R_2) < 0$, wherein R_1 is a latest value of the determined electrical resistance of the resistor immediately prior to said testing.”

The Examiner has not even addressed the preceding features of claim 24 and has therefore not established a *prima facie* case of obviousness in relation to claim 24.

Based on the preceding arguments, Applicants respectfully maintain that claim 24 is not unpatentable over Basseches in view of Poisel and further in view of Mochizuki and skill level of an ordinary person in the art, and that claim 24 is in condition for allowance.

Claims 49-50

Since claims 49-50 depend from claim 23, which Applicants have argued *supra* to not be unpatentable over Basseches in view of Poisel under 35 U.S.C. §103(a), Applicants maintain that claims 49-50 are likewise not unpatentable over Basseches in view of Mochizuki and skill level of an ordinary person in the art under 35 U.S.C. §103(a).

In addition with respect to claims 49-50, Applicants respectfully contend that Basseches in view of Mochizuki and skill level of an ordinary person does not teach or suggest the following features of claims 49-50: “wherein $F < 1$ ” (claim 49); and “wherein $F = 1$ ” (claim 50).

The Examiner has not even addressed the preceding features of claims 49-50 and has therefore not established a *prima facie* case of obviousness in relation to claims 49-50.

Based on the preceding arguments, Applicants respectfully maintain that claims 49-50 are not unpatentable over Basseches in view of Poisel and further in view of Mochizuki and skill level of an ordinary person in the art, and that claims 49-50 are in condition for allowance.

Claim 66

Since claim 66 depends from claim 23, which Applicants have argued *supra* to not be unpatentable over Basseches in view of Poisel under 35 U.S.C. §103(a), Applicants maintain that claim 66 is likewise not unpatentable over Basseches in view of Mochizuki and skill level of an ordinary person in the art under 35 U.S.C. §103(a).

In addition with respect to claim 66, Applicants respectfully contend that Basseches in view of Poisel and further in view of Mochizuki and skill level of an ordinary person does not teach or suggest the following feature of claim 66: “wherein a dimension of the resistor does not exceed about 1 micron”.

The Examiner argues: “Mochizuki teaches at col. 5, lines 113, forming a resistor portion of less than 1 micron ... It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the above references' teachings with a resistor less than 1 micron because the dimension of a resistor determine the resistance of a resistor and such resistance value is taken to be obvious since these are variables of art recognized importance which are subject to routine experimentation and optimization and discovery of an optimum value for a known process is obvious.”

In response, Applicants respectfully contend that the Examiners argument for modifying Basseches to incorporate the preceding feature of claim 66 is not persuasive, because the Examiner has not demonstrated motivation in the prior art for setting an upper limit of 1 micron specifically for a dimension of the resistor.

35 U.S.C. § 103(a): Claims 4 and 59 (Gofuku in view of Mochizuki and Skill level of an ordinary person in the art)

The Examiner rejected claims 4 and 59 under 35 U.S.C. § 103 as allegedly being unpatentable over Gofuku *et al.* as applied to claims 1, 5, 10-12, 47, 55, 56, 57, 60-66, 67, 69 and 71-73 above, and further in view of Mochizuki *et al.* 4,533,935 and Skill level of an ordinary person in the art.

Claim 4

Applicants respectfully contend that claim 16 is not unpatentable over Basseches in view of Poisel, because Basseches in view of Poisel does not teach or suggest each and every feature of claim 16. For example, Basseches in view of Poisel does not teach or suggest the feature: “wherein a dimension of the resistor does not exceed about 1 micron”.

The Examiner argues: “Mochizuki teaches at col. 5, lines 1-13, forming a resistor portion of less than 1 micron and the specific dimension of resistor as claimed are taken to be obvious since these are variables of art recognized importance which are subject to routine experimentation and optimization and discovery of an optimum value for a known process is obvious. In re Aller, 105 USPQ 233 (CCPA 1955). And, even if applicants' modification results in great improvement and utility over the prior art, it may still not be patentable if the modification was within the capabilities of one skilled in the art, In Re Sola 25 USPQ 433.”.

In response Applicants respectfully contend that the Examiner's argument for modifying Gofuku by the alleged teaching of Mochizuki is not persuasive. In particular, Gofuku implements “irradiating a YAG laser beam having ... a spot diameter of 1.5 mm on the resistor

material” (Gofuku, col. 6, lines 16-19). Thus, Gofuku effectively teaches away from using a resistor having a dimension not exceeding about 1 micron, in light of the fact that 1 mm equals 1000 microns.

Claim 59

Since claim 59 depends from claim 5, which Applicants have argued *supra* to not be anticipated by Gofuku, Applicants maintain that claim 59 is likewise not unpatentable over Gofuku in view of Mochizuki and skill level of an ordinary person in the art under 35 U.S.C. §103(a).

In addition with respect to claim 59, Applicants respectfully contend that Gofuku in view of Mochizuki and skill level of an ordinary person in the art does not teach or suggest the following feature of claim 59: “wherein a dimension of the resistor does not exceed about 1 micron”.

The Examiner argues: “Mochizuki teaches at col. 5, lines 1-13, forming a resistor portion of less than 1 micron and the specific dimension of resistor as claimed are taken to be obvious since these are variables of art recognized importance which are subject to routine experimentation and optimization and discovery of an optimum value for a known process is obvious. In re Aller, 105 USPQ 233 (CCPA 1955). And, even if applicants' modification results in great improvement and utility over the prior art, it may still not be patentable if the modification was within the capabilities of one skilled in the art, In Re Sola 25 USPQ 433.”.

In response Applicants respectfully contend that the Examiner’s argument for modifying Gofuku by the alleged teaching of Mochizuki is not persuasive. In particular, Gofuku

implements “irradiating a YAG laser beam having ... a spot diameter of 1.5 mm on the resistor material” (Gofuku, col. 6, lines 16-19). Thus, Gofuku effectively teaches away from using a resistor having a dimension not exceeding about 1 micron, in light of the fact that 1 mm equals 1000 microns.

35 U.S.C. § 103(a): Claims 51-54, 68, and 70 (Gofuku in view of Wang and Blanchard)

The Examiner rejected claims 51-54, 68 and 70 under 35 U.S.C. § 103 as allegedly being unpatentable over Gofuku *et al.* as applied to claims 1,5, 10-12, 47, 55, 56, 57, 60-66, 67,69 and 71-73, above, and further in view of Wang *et al.* 5,547,881 and Blanchard 4,707,909, newly cited.

Since claims 51-54 and 68 depend from claim 5, which Applicants have argued *supra* to not be anticipated by Gofuku, Applicants maintain that claims 51-54 and 68 are likewise not unpatentable over Gofuku in view of Wang and Blanchard under 35 U.S.C. §103(a).

Since claim 68 depends from claim 67, which Applicants have argued *supra* to not be anticipated by Gofuku, Applicants maintain that claim 67 is likewise not unpatentable over Gofuku in view of Wang and Blanchard under 35 U.S.C. §103(a).

Since claim 70 depends from claim 47, which Applicants have argued *supra* to not be anticipated by Gofuku, Applicants maintain that claim 70 is likewise not unpatentable over Gofuku in view of Wang and Blanchard under 35 U.S.C. §103(a).

In addition, Applicants respectfully contend that Gofuku in view of Wang and Blanchard does not teach or suggest the following features of claims 51-54, 68, and 70:

“wherein the beam is the beam of particles” (claim 51);

“wherein the beam is the beam of particles is a beam of electrons” (claim 52);

“wherein the beam is the beam of particles is a beam of protons” (claim 53);

“wherein the beam is the beam of particles is a beam of electrons” (claim 54);

“wherein the molecules at the molecular concentration consist of nitrogen-comprising molecules at the nitrogen concentration” (claim 68); and

“wherein the gaseous particles consist of nitrogen particles” (claim 70).

The Examiner argues: “Gofuku et al. teaches increasing the resistance in a portion of a resistor with laser beam radiation and oxygen gas but does not teach using electron beam or ion beam and using nitrogen gas. However, Wang teaches at col.4, lines 1-17, using ion beam radiation and nitrogen to change the resistivity of a resistor. And, Blanchard teaches at col. 3, lines 23-36, using electron beam radiation to change the resistivity of a resistor... It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the above references' teachings with ion beam or electron beam and/or nitrogen to change the resistivity because ion beam or electron beam would react with the resistor so that the resistivity is altered.”.

In response, Applicants maintain that the Examiner's argument (i.e., it is obvious “to change the resistivity ... so that the resistivity is altered”) is circular reasoning and thus not persuasive.

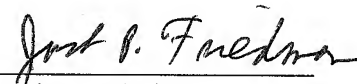
In addition with respect to claim 53, neither Wang nor Blanchard teach that the beam of particles is a beam of protons.

In addition with respect to claim 68, Wang, col.4, lines 1-17 teaches that the beam of particles is a beam of nitrogen ions, rather than a beam of nitrogen-comprising molecules as claimed.

CONCLUSION

Based on the preceding arguments, Applicants respectfully believe that all pending claims and the entire application meet the acceptance criteria for allowance and therefore request favorable action. If the Examiner believes that anything further would be helpful to place the application in better condition for allowance, Applicants invites the Examiner to contact Applicants' representative at the telephone number listed below. The Director is hereby authorized to charge and/or credit Deposit Account No. 09-0457.

Date: 06/28/2006



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